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ESTADO DE SONORA

SECRETARIA DE
SALUD PUBLICA

SERVICIOS DE SALUD DE SONORA
SUBSECRETARIA DE SERVICIOS DE SALUD
DIRECCION GENERAL DE SERVICIOS DE SALUD A LA COMUNIDAD
DIRECCION DE EPIDEMIOLOGIA

THE SITUATION OF DENGUE IN SONORA 2007 – 2008*



* EPIDEMIOLOGICAL WEEK NO. 11

Sonora
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Dengue Virus

- Causes dengue and dengue hemorrhagic fever
- Is an arbovirus
- Transmitted by mosquitoes
- Composed of single-stranded RNA
- Has 4 serotypes (DEN-1, 2, 3, 4)

Source: CDC





Dengue Viruses

- Each serotype provides specific lifetime immunity, and short-term cross-immunity
- All serotypes can cause severe and fatal disease
- Genetic variation within serotypes
- Some genetic variants within each serotype appear to be more virulent or have greater epidemic potential

Source: CDC

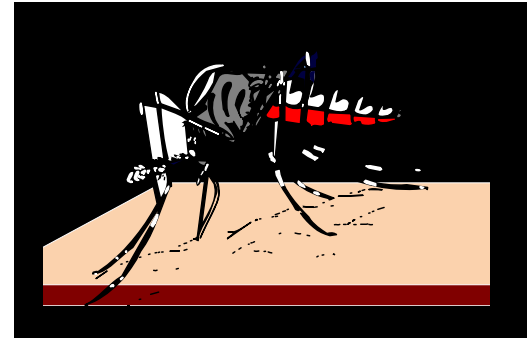




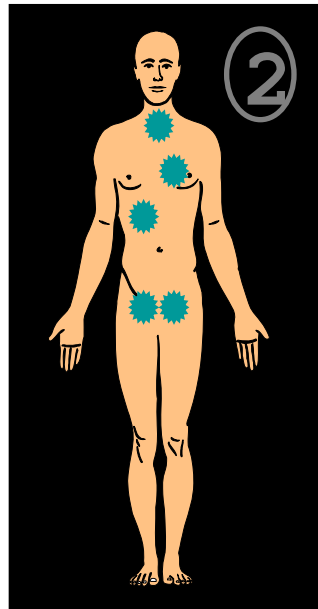
Replication and Transmission of Dengue Virus

1. The virus is transmitted to human in mosquito saliva
2. Virus replicates in target organs
3. Virus infects white blood cells and lymphatic tissues
4. Virus released and circulates in blood

1



2



3



4



Source: CDC



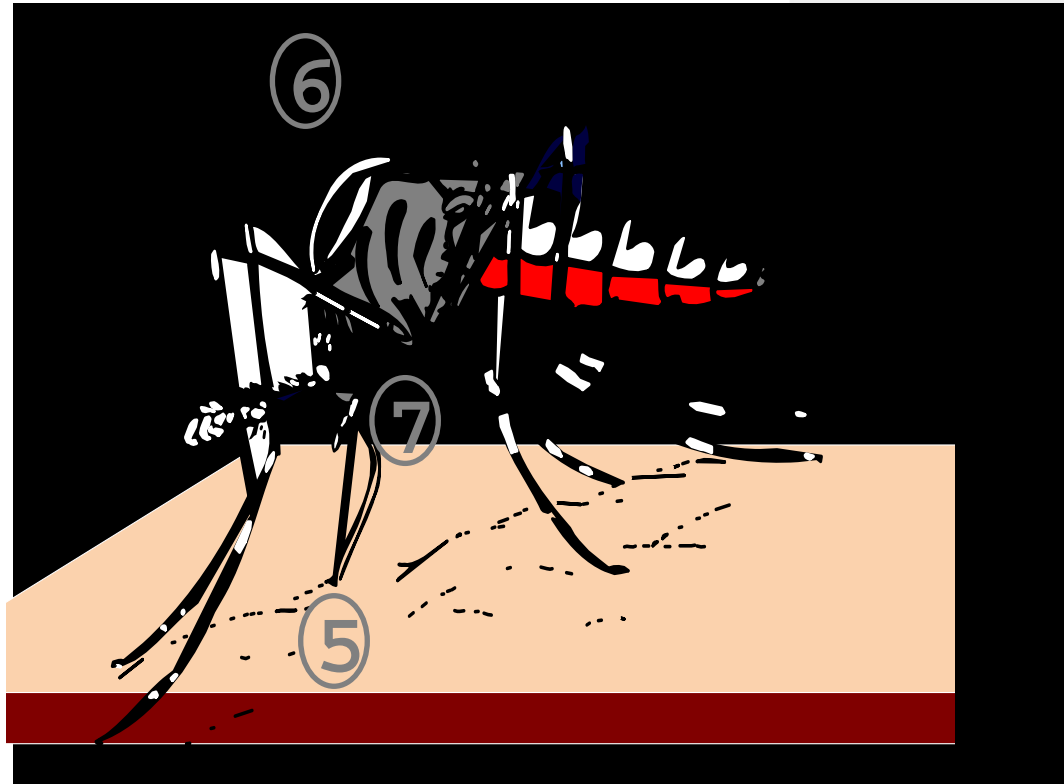


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Replication and Transmission of Dengue Virus

5. Second mosquito ingests virus with blood
6. Virus replicates in the mosquito's midgut and other organs, and infects salivary glands
7. Virus replicates in salivary glands



Source: CDC





Aedes aegypti

- Dengue transmitted by infected female mosquito
- Primarily a daytime feeder
- Lives around human habitation
- Lays eggs and produces larvae preferentially in artificial containers
- The average height over sea level where the mosquito lives is 3,600 ft. (highest registrations are 6,600 ft. in Colombia, 4,100 ft. in Mexico and 3,870 ft. in Agua Prieta, Sonora)

Sources: CDC/UVE





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Dengue Clinical Syndromes

- Undifferentiated fever
- Classic dengue fever
- Dengue hemorrhagic fever
- Dengue shock syndrome

Source: CDC





Undifferentiated Fever

- **May be the most common manifestation of dengue**
- **Prospective study found that 87% of students infected were either asymptomatic or only mildly symptomatic**
- **Other prospective studies including all age- groups also demonstrate silent transmission**



Source: DS Burke, et al. A prospective study of dengue infections in Bangkok. Am J Trop Med Hyg 1988; 38:172-80.



Clinical Characteristics of Dengue Fever

- **Hyperthermia (Fever)**
- **Headache**
- **Muscle and joint pain**
- **Nausea/vomiting**
- **Rash**
- **Hemorrhagic manifestations**

Source: CDC





Hemorrhagic Manifestations of Dengue

- Skin hemorrhages: petechiae, purpura, ecchymoses
- Gingival bleeding
- Nasal bleeding
- Gastro-intestinal bleeding: hematemesis, melena, hematochezia
- Hematuria
- Increased menstrual flow

Source: CDC





Clinical Case Definition for Dengue Hemorrhagic Fever

4 Necessary Criteria:

- Fever, or recent history of acute fever
- Hemorrhagic manifestations
- Low platelet count ($100,000/\text{mm}^3$ or less)
- Objective evidence of “leaky capillaries:”
 - ❖ elevated hematocrit (20% or more over baseline)
 - ❖ low albumin
 - ❖ pleural or other effusions

Source: CDC

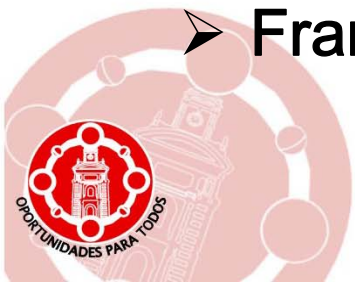




Clinical Case Definition for Dengue Shock Syndrome

- 4 criteria for Dengue Hemorrhagic Fever PLUS:
- Evidence of circulatory failure manifested indirectly by all of the following:
 - ❖ Rapid and weak pulse
 - ❖ Narrow pulse pressure (≤ 20 mm Hg) OR hypotension for age
 - ❖ Cold, clammy skin and altered mental status
- Frank shock is direct evidence of circulatory failure

Source: CDC





Danger Signs in Dengue Hemorrhagic Fever

- Abdominal pain - intense and sustained
- Persistent vomiting
- Abrupt change from fever to hypothermia, with sweating and prostration
- Restlessness or somnolence

Source: Martínez Torres E. Salud_Pública_Mex 37 (supl):29-44, 1995





Warning Signs for Dengue Shock

Four Criteria for DHF:

- Fever
- Hemorrhagic manifestations
- Excessive capillary permeability
- $< 100,000/\text{mm}^3$ platelets

Initial Warning Signals:

- Disappearance of fever
- Drop in platelets
- Increase in hematocrit

Alarm Signals:

- Severe abdominal pain
- Prolonged vomiting
- Abrupt change from fever to hypothermia
- Change in level of consciousness (irritability or somnolence)

When Patients Develop DSS:

- 3 to 6 days after onset of symptoms

Source: CDC



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Unusual Presentations of Severe Dengue Fever

- **Encephalopathy**
- **Hepatic damage**
- **Cardiomyopathy**
- **Severe gastrointestinal hemorrhage**

Source: CDC

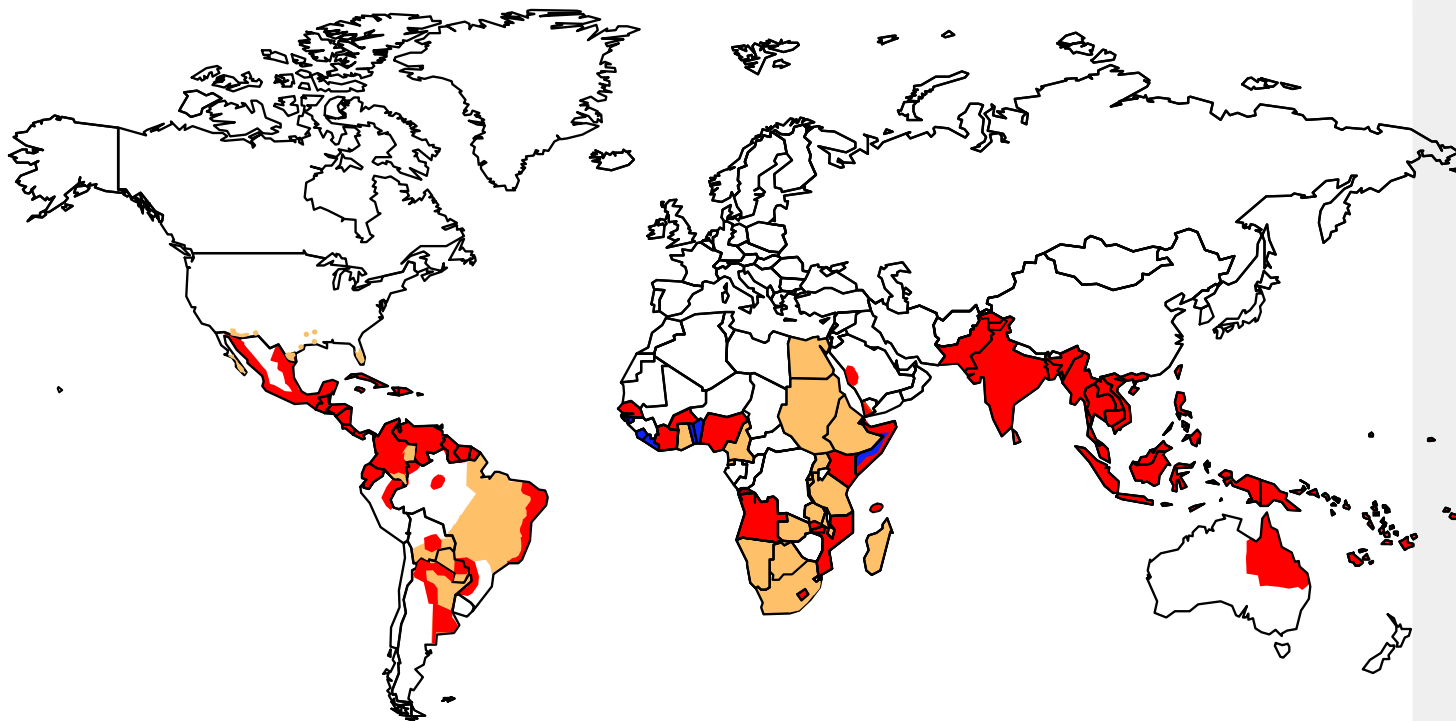




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World Distribution of Dengue - 2005



- Areas infested with *Aedes aegypti*
- Areas with *Aedes aegypti* and dengue epidemic activity

Source: CDC





Recent Dengue in the U.S.A.

- Dengue epidemics occurred in the USA in the 1800's and the first half of the 1900's
- Recent indigenous transmission
 - ❖ Texas:
 - 1980: 23 cases, first locally acquired since 1945
 - 1986: 9 cases, 1995: 7 cases, 1997: 3 cases, 1998: 1 case, 1999: 18 cases, 2005: 25 cases
 - ❖ Hawaii:
 - 2001-2002: 122 cases (first since 1944)

Source: CDC





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Mexican States with the Highest Incidence of DF and HDF Cases in 2007

DENGUE FEVER

No.	State	Cases	
		Total 2007	%
1	Veracruz	12,137	29.92
2	Oaxaca	4,003	9.87
3	Quintana Roo	3,473	8.56
4	Guerrero	3,381	8.34
5	Nuevo León	2,343	5.77
27	Sonora	14	0.03
	Total in Mexico	40,559	100

HEMORRHAGIC DENGUE FEVER

No.	State	Cases	
		Total 2007	%
1	Veracruz	1,962	24.84
2	Guerrero	1,148	14.54
3	Oaxaca	896	11.35
4	Quintana Roo	806	10.21
5	Chiapas	688	8.71
22	Sonora	1	0.01
	Total in Mexico	7,897	100

*Source: Boletín Epidemiología DGE

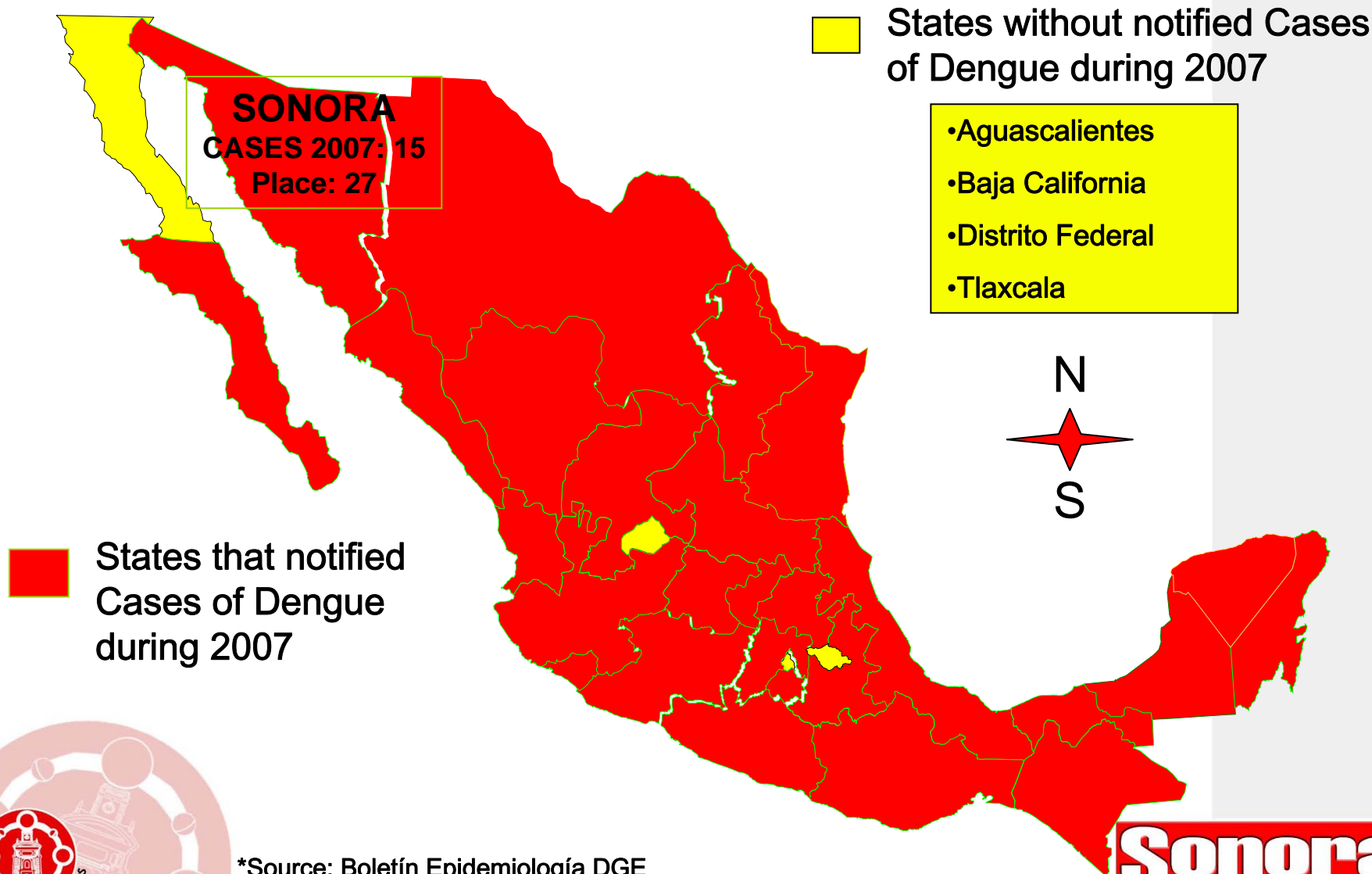




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Notified Cases of Dengue by State Mexico 2007



*Source: Boletín Epidemiología DGE



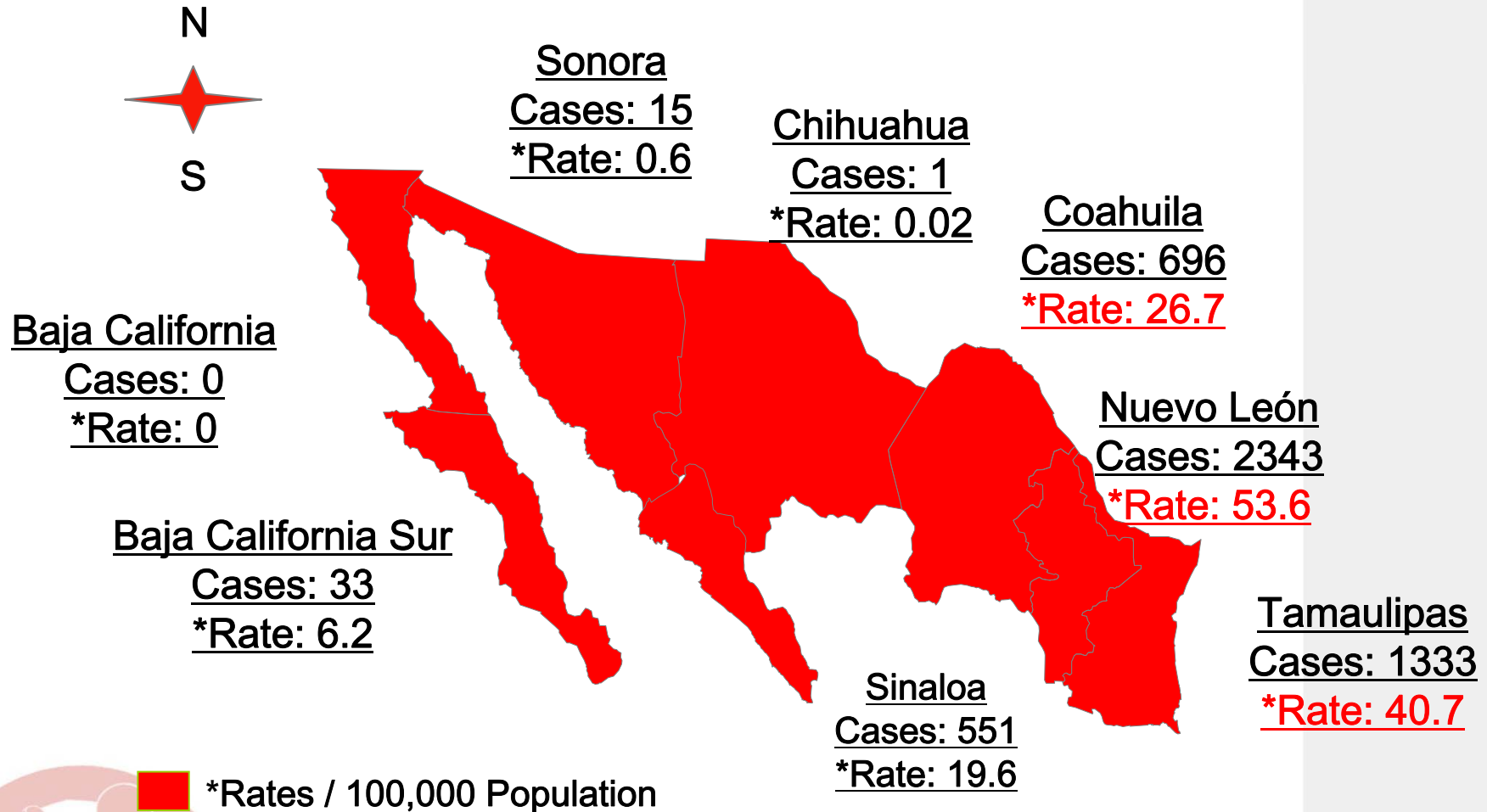
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Reported Cases of Dengue in the Mexican Northern and Border States. 2007



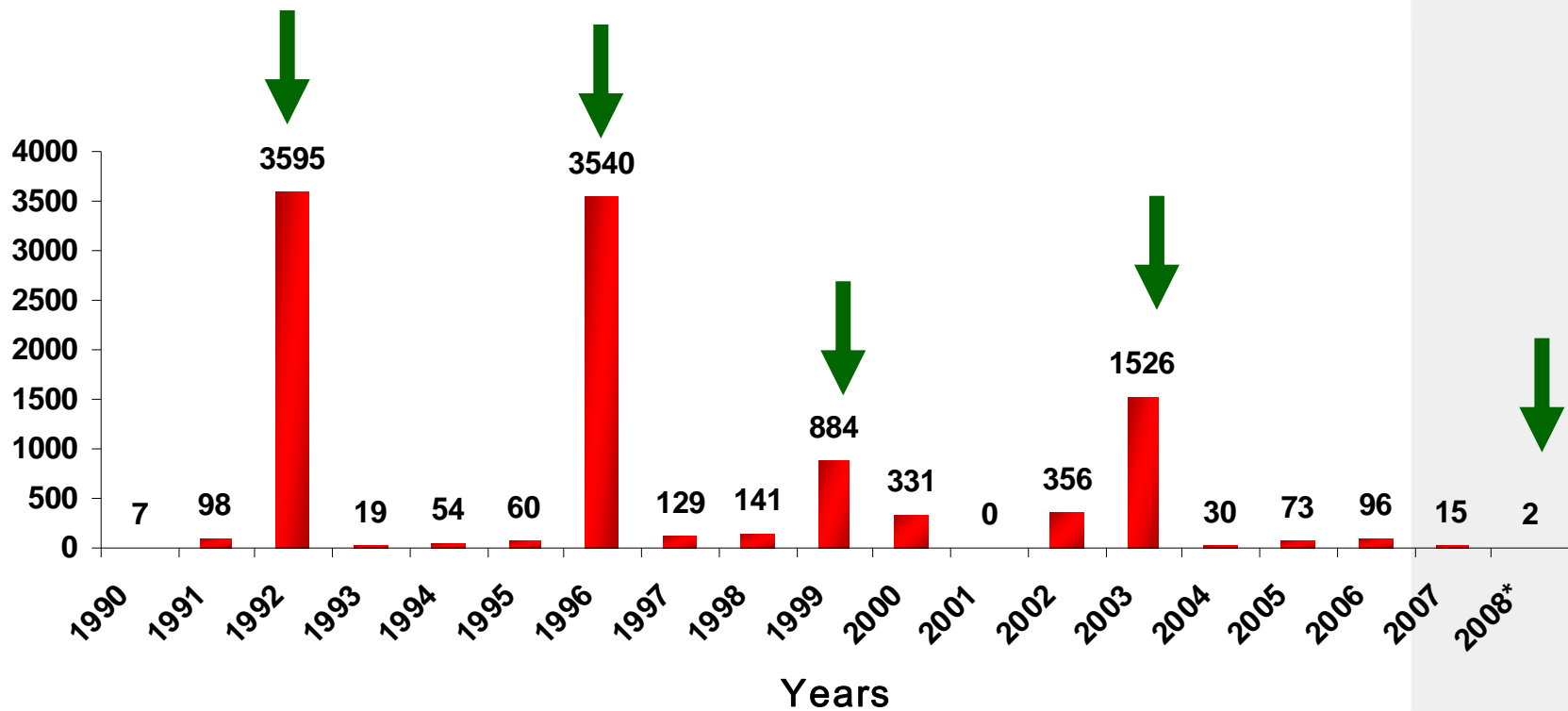
*Source: UVE / Boletín Epidemiología DGE



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Confirmed Cases of Dengue by Year 1990– 2008*



Source: LESP/UVE/DE/DGSSC/SSS

* Epidemiological Week No. 11





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Circulating Serotypes of Denguevirus in Sonora 2002 - 2007

YEAR	CIRCULATING SEROTYPES
2002	1, 2
2003	2, 3, 4
2004	1, 3, 4
2005	1, 2 , 3 , 4
2006	1,2
2007	1
2008	?

*Source: LESP/UVE/DE/DGSSC/SSS

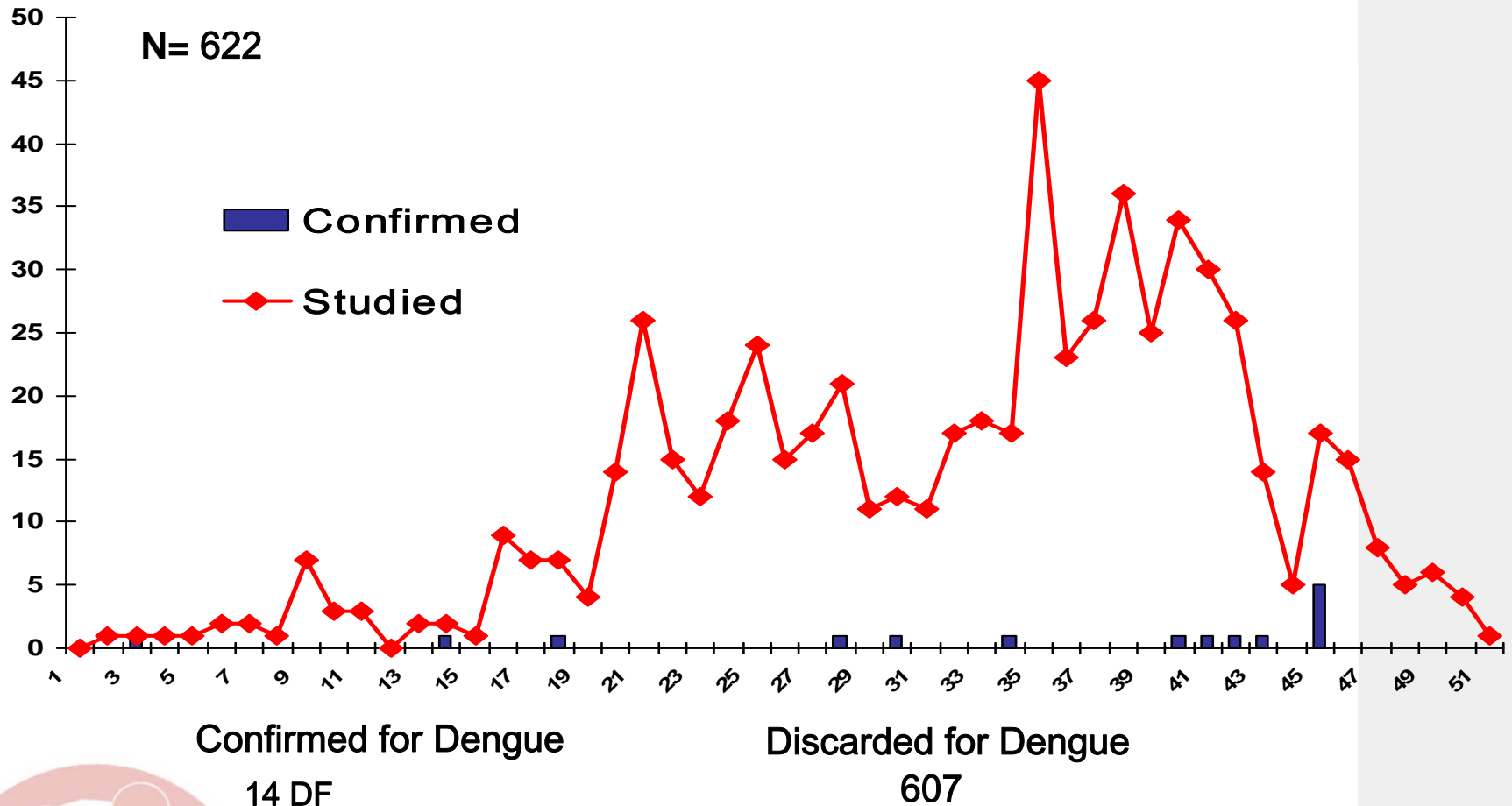




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Studied Cases of Febril Syndrome and Dengue Sonora 2007



Source: UVE/DE/DGSSC/SSS

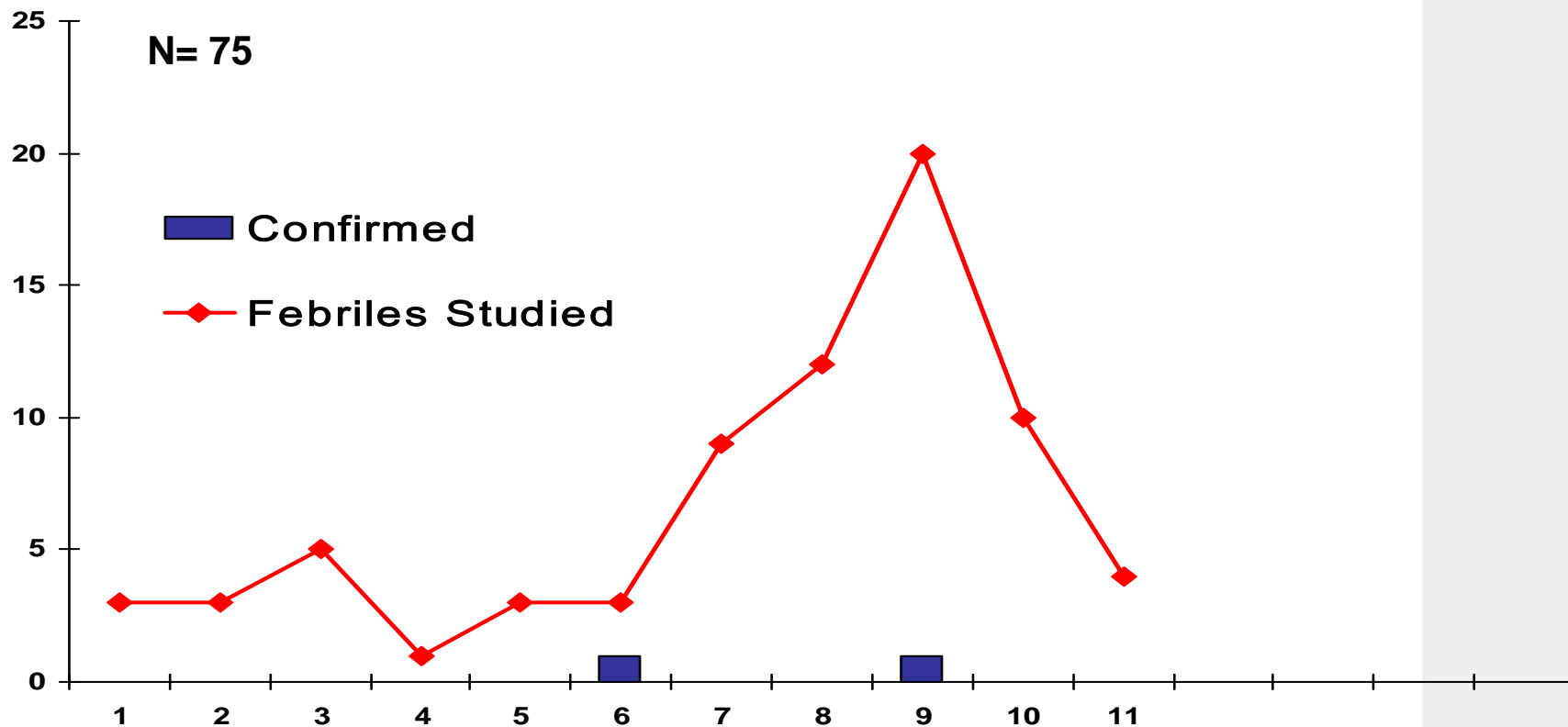




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Studied Cases of Febril Syndrome and Dengue Sonora 2008*



Positives
2 (IgM)

In Study
9 IgM and 10 Virus Isolation

Source: UVE/DE/DGSSC/SSS

*Preliminar information including Week No. 11





Conditions that Contribute to the High Risk of a Dengue Breakout in Sonora

- The cyclic behavior of Dengue
- The circulating serotypes (serotypes 1, 2 and 4)
- The socio-demographic dynamics (migration and commerce)
- Early beginning (confirmation of first case in week 6)
- Endurance of the risk conditions

Source: UVE/DE/DGSSC/SSS





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Plan for the Enhanced Surveillance, Prevention and Control of Dengue in Sonora During 2008

- **Early Alert for the Epidemiological Active Surveillance**
- **Communication and Broadcast**
- **Vector's Control and Social Participation**

Source: UVE/DE/DGSSC/SSS





Early Alert for the Epidemiological Active Surveillance

- ❖ The release of an Epidemiological Alert in which the technical criteria are issued to be followed by the entire Health Sector.
- ❖ Establishment of the systematic study and immediate notification of all the Febril Diseases.
- ❖ The conformation of the leading Medical Teams for the study, clasification of cases, treatment and trainment of the hospital's medical staffs.

Source: UVE/DE/DGSSC/SSS





Early Alert for the Epidemiological Active Surveillance

- ❖ **The strengthening of the medical's staff training in the units of first contact and primary attention (first level of attention).**
- ❖ **Assure the correct collection and the appropriate delivery of the blood samples.**
- ❖ **The activation of the monitor “Clinics of Febril Diseases” in 8 units of first level attention in the municipalities of Hermosillo, Guaymas, Cd. Obregón, Navojoa and Huatabampo.**

Source: UVE/DE/DGSSC/SSS





Communication and Broadcast

- ❖ Sole Spokesman for the broadcasting of the behavior of Dengue and other febril diseases, and the risk conditions based on the entomological indexes.
- ❖ The participation of the entire Health Sector in actions of educational communication for the prevention of Dengue, with particular emphasis in the social promotion of the strategies of “Patio Limpio” (Clean Backyard) and “Cuidado del Agua Almacenada” (Safety of the Stored Water).

Source: UVE/DE/DGSSC/SSS





Communication and Broadcast

- ❖ **A sustained impulse leaded by the state executive authorities promoting the municipal and the society in general participation in the “Operación Todos Contra el Dengue” (All Together Against Dengue Operation).**
- ❖ **The broadcasting of T. V. and Radio spots about Dengue prevention.**

Source: UVE/DE/DGSSC/SSS





Vector's Control and Social Participation

- ❖ A sustained effort adding human resources for the activities of “Patio Limpio”, “Cuidado del Agua Almacenada”, with the fisical (elimination of trash and junk) and chemical (larvicidal agent) controls.
- ❖ Assure the supply of the larvicidal and insecticide agents (eliminate the mosquito and breeding sites), equipment and vehicles por the movilization of the personnel and fumigation.

Source: UVE/DE/DGSSC/SSS





Vector's Control and Social Participation

❖ **The stratification of 8 municipalities and 232 localities of high risk in Hermosillo, Guaymas, Empalme, Cd. Obregón, Bacum, Benito Juárez, Navojoa and Huatabampo with the following purposes:**

- **Weekly evaluation of the entomological indexes**
- **Enhancement of the PL and CAA strategies**
- **Achieve entomological indexes under 5%**
- **Encourage the organized social response**

Source: UVE/DE/DGSSC/SSS





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Let's Fight the Bite!



Thank You Very Much!

